Iowa Farm Science

Volume 7 | Number 1 Article 5

7-1952

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Raymond R. Beneke
Iowa State College

Thomas Payne
Iowa State College

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by Raymond R. Beneke and Thomas Payne

MANY FARMERS thinking about putting up grass silage are wondering, "How much will it cost?" Let's see what it does cost so you can do a better job of weighing the advantages against the costs of ensiling part of a crop.

To pin down the problem, we analyzed the change in harvesting cost occurring when a farmer who normally puts up 30 acres of hay changes to ensiling 20 acres of the first cutting. If the hay normally yields 3 tons per acre, he'd be changing from putting up 90 tons of hay to putting up 60 tons of hay plus 80 tons of silage. We found this to be a typical change on the farms we studied.

Total cost of moving 30 acres of forage from windrow to storage under the two situations is compared in table 1. Costs are given for five different methods used for haying. These are compared with the cost of ensiling part of the crop with a custom-owned chopper except in the case where the operator owned the chopper.

Cost estimates are based upon average performance rates of these machines under farm conditions. We've charged all labor at $1.25 per hour plus $12 per hour for the field chopper and other special equipment and two men usually furnished by the custom operator.

While there was a great deal of variation in the charge being made for custom work in the area we studied, we found $12 per hour to be the most common 1951 rate. The grass silage cost, on a per ton basis (including all labor) was about $3.25 where equipment was custom hired. To compare this cost directly with haying costs, remember that it takes 2⅔ tons of 70-percent moisture silage to equal 1 ton of 20-percent moisture hay on a dry matter basis.

In all the situations we studied, ensiling part of the crop resulted in higher costs than using it all for hay. But how much the costs increased depended upon both the haying and ensiling methods used.

The *smallest* added cost from making grass silage came where the operator was equipped with a field chopper of his own for haying. Here he was already standing the heavy fixed cost on the field chopper. The *greatest* added cost came where the operator owned a baler but not a chopper. Here he still had to stand the fixed cost on a baler—a large part of the baling cost—even though he reduced the number of tons of hay harvested and baled. In addition he had to pay out money for the services of a field chopper. On farms with as small an acreage of forage as used in the example, ownership of either a baler or field chopper is not economical.

Out-of-Pocket Costs

In many cases the increase in out-of-pocket costs from the addition of grass silage will be greater than indicated in table 1. While the size of the crew varied from 3 to 7 on the farms we studied, we found that under most conditions 4 or 5 men are needed to put up grass silage efficiently. Thus you may have to use more hired labor than for most haying operations. So while we charged all labor at $1.25 in table 1, a greater amount of the labor bill may be a cash cost when you make grass silage.

Added costs given in table 1 are *over and above* the cost of harvesting forage in the form of hay. So they must be weighed against the added return you expect to get from making grass silage.

Making silage increases the yield of feed nutrients per acre by reducing loss in the harvesting operation. And a higher proportion of the most costly feed nutrients such as protein and carotene is saved by making silage. As a farm operator, you'll want to be sure you can profitably use more and better-quality forage before you incur the added cost of obtaining it .

Once You've Decided . . .

Once you've decided to make grass silage, your problem is one of planning an economical machine arrangement for harvesting *both* hay and silage. All farm operators we interviewed used field choppers to harvest grass silage. Several reported they'd used a hayloader and stationary silo filler in past years but had given it up because of high labor requirements. (Studies show that at least twice as much labor is involved with the loader and stationary filler as with the field chopper.)

Where both hay and silage are harvested, you can work out a variety of machine arrangements. We've compared the costs of harvesting different acreages of a combination of hay and grass silage with five different machine arrangements (see table 2). These costs have been worked out for a common forage combination where two-thirds of the first cutting is put up as silage and the remainder of the crop as hay. Costs apply only to moving the forage from windrow to storage. Resulting tonnages of hay and grass silage which would be harvested from a given acreage (based on a 3-ton hay crop) are shown in columns 2 and 3 of table 2. Again costs are based on average performance rates under farm conditions and include a charge of $1.25 per hour for all labor.

Notice that the comparisons emphasize the cost advantage of using a field chopper on both hay and forage where they are produced in combination. But the high fixed cost involved in owning a field chopper and the equipment to go with it makes actual ownership uneconomical where forage acreage is limited. Our costs indicate that it's cheaper to hire a field chopper where less than 50 acres are harvested. And if capital is limited, it may be to your advantage to hire a field chopper even though it's used for more than 50 acres.

RAYMOND R. BENEKE is associate professor of farm management. THOMAS PAYNE is a former graduate student in agricultural economics.

Your guiding principle here is to decide whether putting more money into forage-harvesting equipment will mean diverting it from more productive investments such as livestock, feed or fertilizer.

Using a field chopper on a limited acreage can also be made more economical through shared ownership. This way fixed costs per year can be cut in half for each operator—reduced by about $200 in the case of the field chopper and special equipment. The cost of owning a field chopper as it applies to making grass silage is reduced similarly if you also use it to make corn silage.

Some farmers have had difficulty in getting work done on time when they depend upon a custom operator or jointly owned machinery. But only a quarter of the farmers included in our study owned the field choppers they used. The rest hired the chopper on a custom basis or owned the machine jointly.

If you're planning on making grass silage one of the decisions you must make is whether to buy needed equipment or hire it at custom rates. Depending upon your own situation, there are advantages for each. The accompanying article may help you reach this decision.

Besides Costs . . .

There are other things, however, besides costs alone that may influence your choice of a machine arrangement. Some farmers object to chopped hay. Where this is true, owning a field chopper is out of the question unless very large acreages are made into silage This generally means hiring a custom chopper for silage and either baling the hay or putting it up with a hay loader.

If you own a chopper and part of the forage crop put up as hay is baled or put up with a loader rather than chopped, your costs are increased that much more. This is particularly true when you use the baler for only a limited acreage. But many farmers are willing to stand the greater cost of baling in order to have the hay "done-up" in a form which can be conveniently stored and fed. (A number of farmers apparently make grass silage only as an emergency measure in case of bad weather and don't plan to make it every year. Hiring the field chopper seems best under these conditions—especially where it won't be used for a large acreage.)

We haven't considered in this article the labor costs involved in feeding grass silage. A number of farmers in the study said it required more labor to feed grass silage than hay. This is partly because a greater tonnage of feed in the form of silage must be handled. But in many cases—especially where temporary storage was used—not enough attention was given to locating the silo where silage could be fed easily.

Silage often is fed at a time of year when the operator isn't pressed for time. But when you are locating your silo, remember that silage must be "taken out" as well as "put in." Proper location will reduce the amount of heavy work in feeding silage.

TABLE 1.

Thirty-Acre Comparison of the Total Cost Including All Labor of Putting up 90 Tons of Hay With the Cost of Making 60 Tons of Hay Plus 80 Tons of Grass Silage;[1] Field Chopper and Special Equipment Hired Except Where Owned by Operator.

Method used to put up hay	Total cost when all put up as hay	Total cost when 20 acres ensiled[2]	Added cost of ensiling 80 tons
Hay loader	$453	$587	$134
Hire baler	507	600	93
Own baler	707	861	154
Own field chopper	645	698	53

[1] Based on forage yielding 3 tons of hay per acre or 1.5 tons of hay and 4 tons of grass silage. Cost includes all labor charged at $1.25 per hour.

[2] Field chopper and special equipment custom hired except in last comparison where field chopper is owned by the operator.

TABLE 2.

Total Cost of Harvesting a Combination of Hay and Grass Silage With Different Machine Arrangements; Two-Thirds of First Cutting Ensiled, Remainder Put Up as Hay

Acres of forage harvested	Tons of hay harvested	Tons grass silage harvested	Total Cost: Own field chopper	Hire field chopper	Hire field chopper and own hay loader	Hire field chopper and hire baler	Hire field chopper and own baler
20	40	53	$ 611	$ 354	$ 414	$ 399	$ 700
40	80	106	789	707	758	797	1,019
60	120	159	957	1,060	1,101	1,195	1,336
80	160	212	1,140	1,414	1,446	1,594	1,655
100	200	265	1,303	1,722	1,791	1,993	1,974